Creation of a Map through Python

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Geog 375, Spring 2014
Prof. Nathan Jennings

Purpose

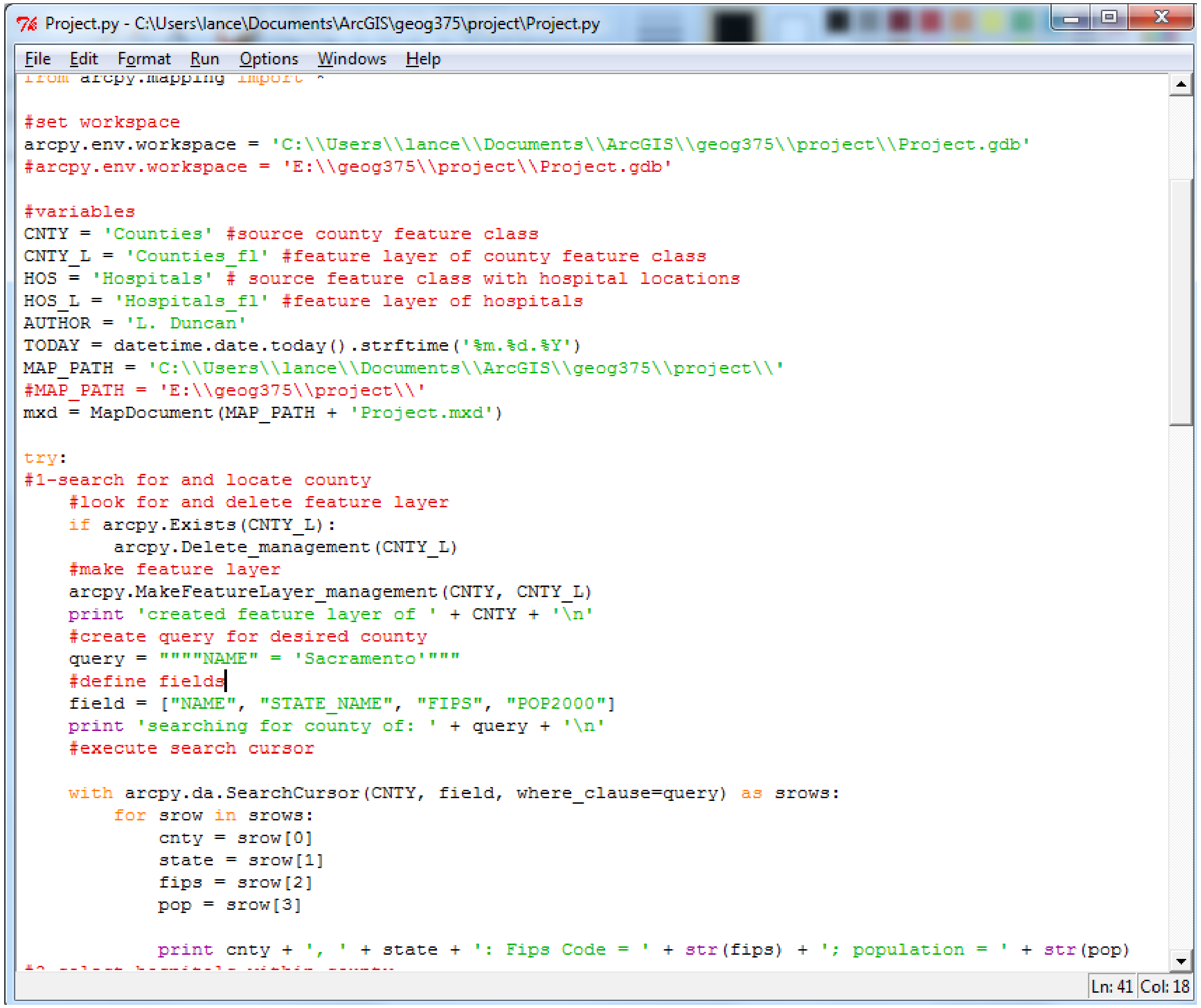
Write a script which would allow the user to input a county

Generate map showing all the hospitals in that county

Tasks

- Roadblocks led to two different scripts
- I abandoned the first
- My second attempt proved successful

Attempt 1



Project.py - C:\Users\lance\Documents\ArcGIS\geog375\project\Project.py

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```
from arcpy.mapping import *

#set workspace
arcpy.env.workspace = 'C:\\Users\\lance\\Documents\\ArcGIS\\geog375\\project\\Project.gdb'
#arcpy.env.workspace = 'E:\\geog375\\project\\Project.gdb'

#variables
CNTY = 'Counties' #source county feature class
CNTY_L = 'Counties_fl' #feature layer of county feature class
HOS = 'Hospitals' # source feature class with hospital locations
HOS_L = 'Hospitals_fl' #feature layer of hospitals
AUTHOR = 'L. Duncan'
TODAY = datetime.date.today().strftime('%m.%d.%Y')
MAP_PATH = 'C:\\Users\\lance\\Documents\\ArcGIS\\geog375\\project\\'
#MAP_PATH = 'E:\\geog375\\project\\'
mxd = MapDocument(MAP_PATH + 'Project.mxd')

try:
#1-search for and locate county
    #look for and delete feature layer
    if arcpy.Exists(CNTY_L):
        arcpy.Delete_management(CNTY_L)
    #make feature layer
    arcpy.MakeFeatureLayer_management(CNTY, CNTY_L)
    print 'created feature layer of ' + CNTY + '\n'
    #create query for desired county
    query = """"NAME" = 'Sacramento'"""
    #define fields
    field = ["NAME", "STATE_NAME", "FIPS", "POP2000"]
    print 'searching for county of: ' + query + '\n'
    #execute search cursor

    with arcpy.da.SearchCursor(CNTY, field, where_clause=query) as srows:
        for srow in srows:
            cnty = srow[0]
            state = srow[1]
            fips = srow[2]
            pop = srow[3]

            print cnty + ', ' + state + ': Fips Code = ' + str(fips) + '; population = ' + str(pop)
#2-select hospitals within county
```

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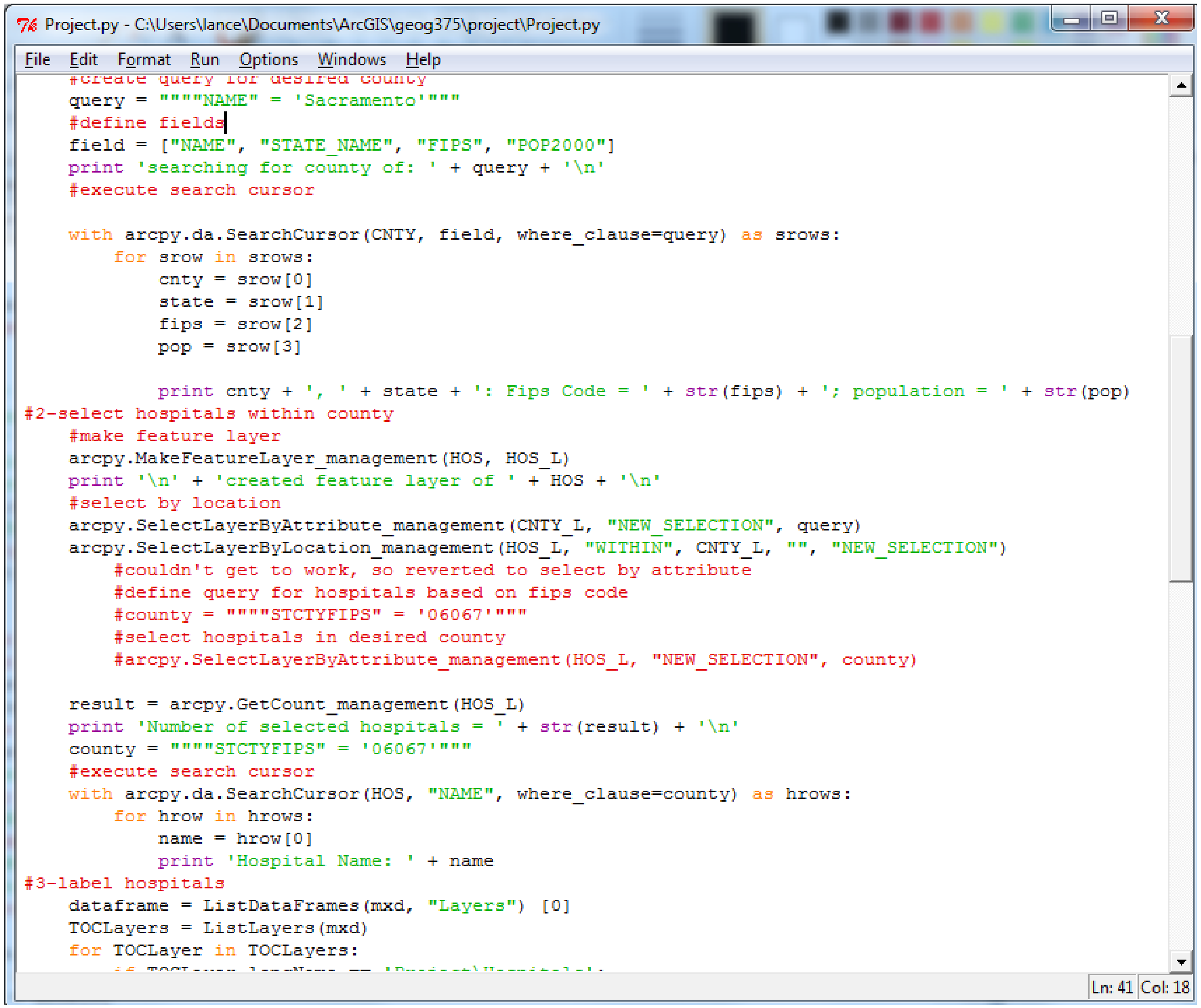
Attempt 1


Project.py - C:\Users\lance\Documents\ArcGIS\geog375\project\Project.py
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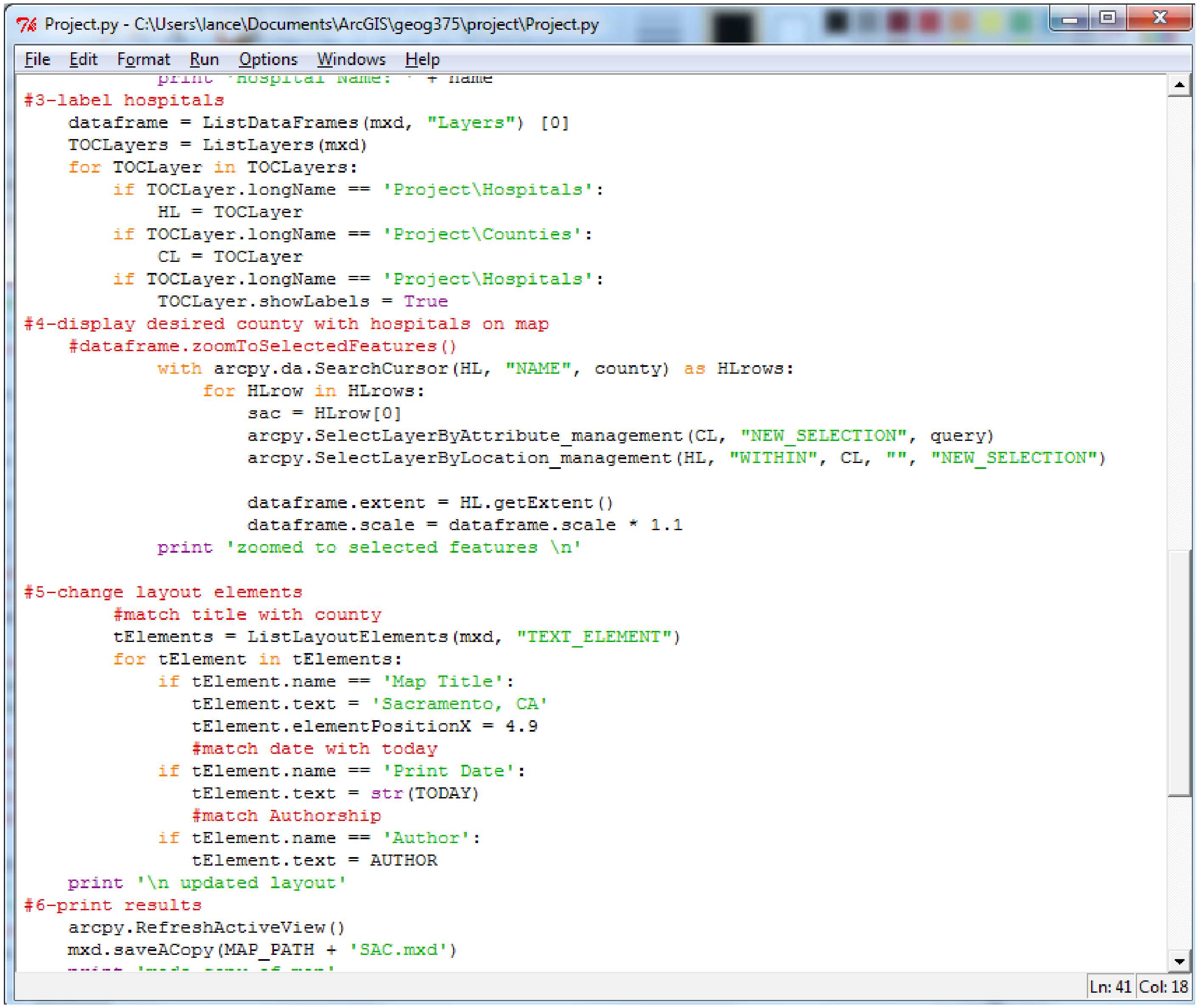
```
    #create query for desired county
    query = """"NAME" = 'Sacramento'"""
    #define fields
    field = ["NAME", "STATE_NAME", "FIPS", "POP2000"]
    print 'searching for county of: ' + query + '\n'
    #execute search cursor

    with arcpy.da.SearchCursor(CNTY, field, where_clause=query) as srows:
        for srow in srows:
            cnty = srow[0]
            state = srow[1]
            fips = srow[2]
            pop = srow[3]

            print cnty + ', ' + state + ': Fips Code = ' + str(fips) + '; population = ' + str(pop)
#2-select hospitals within county
    #make feature layer
    arcpy.MakeFeatureLayer_management(HOS, HOS_L)
    print '\n' + 'created feature layer of ' + HOS + '\n'
    #select by location
    arcpy.SelectLayerByAttribute_management(CNTY_L, "NEW_SELECTION", query)
    arcpy.SelectLayerByLocation_management(HOS_L, "WITHIN", CNTY_L, "", "NEW_SELECTION")
        #couldn't get to work, so reverted to select by attribute
        #define query for hospitals based on fips code
        #county = """"STCTYFIPS" = '06067'"""
        #select hospitals in desired county
        #arcpy.SelectLayerByAttribute_management(HOS_L, "NEW_SELECTION", county)

    result = arcpy.GetCount_management(HOS_L)
    print 'Number of selected hospitals = ' + str(result) + '\n'
    county = """"STCTYFIPS" = '06067'"""
    #execute search cursor
    with arcpy.da.SearchCursor(HOS, "NAME", where_clause=county) as hrows:
        for hrow in hrows:
            name = hrow[0]
            print 'Hospital Name: ' + name
#3-label hospitals
    dataframe = ListDataFrames(mxd, "Layers") [0]
    TOCLayers = ListLayers(mxd)
    for TOCLayer in TOCLayers:
        if TOCLayer.longName == 'Project\Hospitals':
```

Attempt 1


Project.py - C:\Users\lance\Documents\ArcGIS\geog375\project\Project.py
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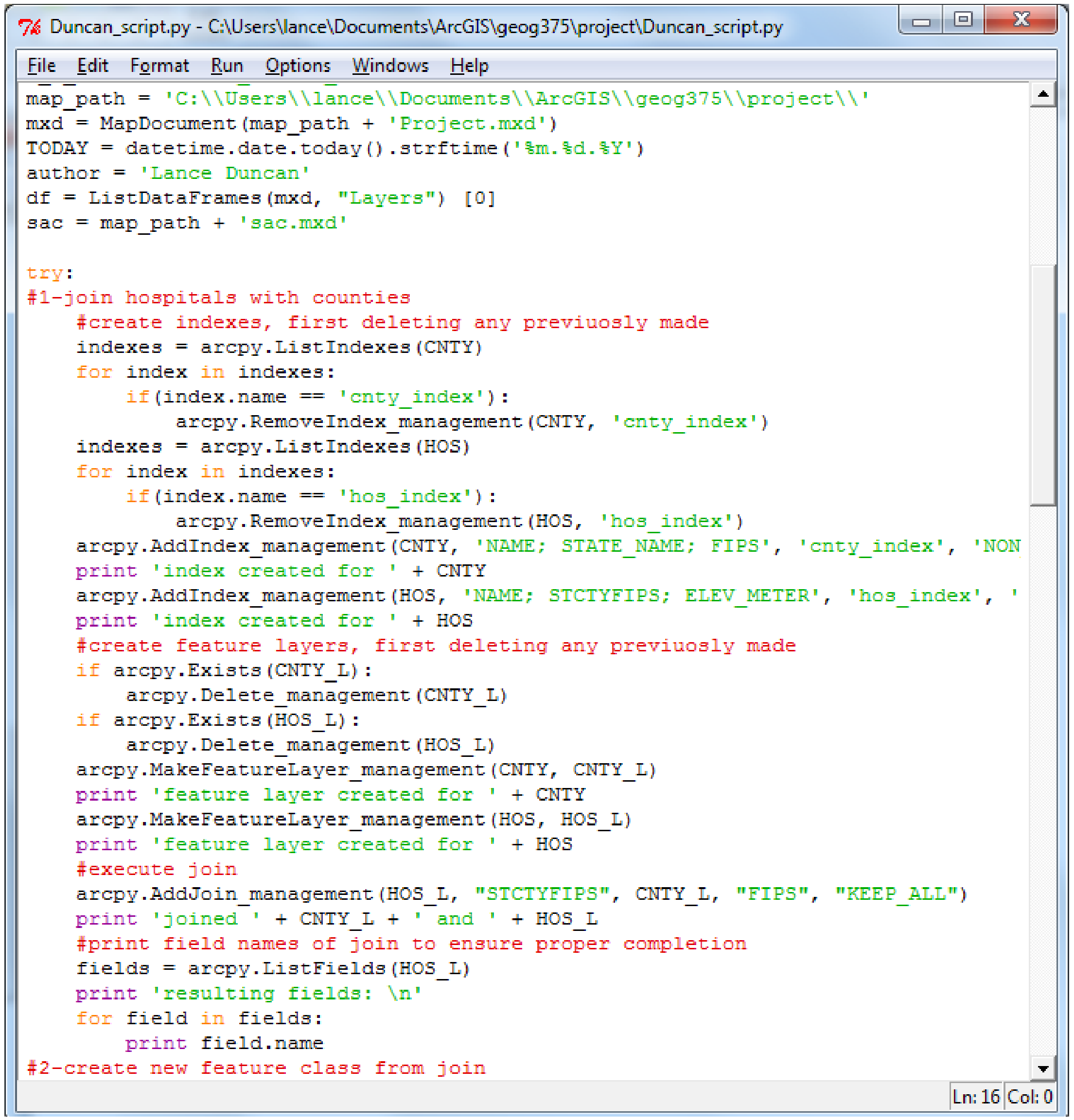
```
            print 'Hospital Name: ' + name
#3-label hospitals
    dataframe = ListDataFrames(mxd, "Layers") [0]
    TOCLayers = ListLayers(mxd)
    for TOCLayer in TOCLayers:
        if TOCLayer.longName == 'Project\Hospitals':
            HL = TOCLayer
        if TOCLayer.longName == 'Project\Counties':
            CL = TOCLayer
        if TOCLayer.longName == 'Project\Hospitals':
            TOCLayer.showLabels = True
#4-display desired county with hospitals on map
    #dataframe.zoomToSelectedFeatures()
            with arcpy.da.SearchCursor(HL, "NAME", county) as HLrows:
                for HLrow in HLrows:
                    sac = HLrow[0]
                    arcpy.SelectLayerByAttribute_management(CL, "NEW_SELECTION", query)
                    arcpy.SelectLayerByLocation_management(HL, "WITHIN", CL, "", "NEW_SELECTION")

                    dataframe.extent = HL.getExtent()
                    dataframe.scale = dataframe.scale * 1.1
            print 'zoomed to selected features \n'

#5-change layout elements
        #match title with county
        tElements = ListLayoutElements(mxd, "TEXT_ELEMENT")
        for tElement in tElements:
            if tElement.name == 'Map Title':
               tElement.text = 'Sacramento, CA'
               tElement.elementPositionX = 4.9
               #match date with today
            if tElement.name == 'Print Date':
               tElement.text = str(TODAY)
               #match Authorship
            if tElement.name == 'Author':
               tElement.text = AUTHOR
    print '\n updated layout'
#6-print results
    arcpy.RefreshActiveView()
    mxd.saveACopy(MAP_PATH + 'SAC.mxd')
    print 'made copy of map'
```

Attempt 2



Duncan_script.py - C:\Users\lance\Documents\ArcGIS\geog375\project\Duncan_script.py
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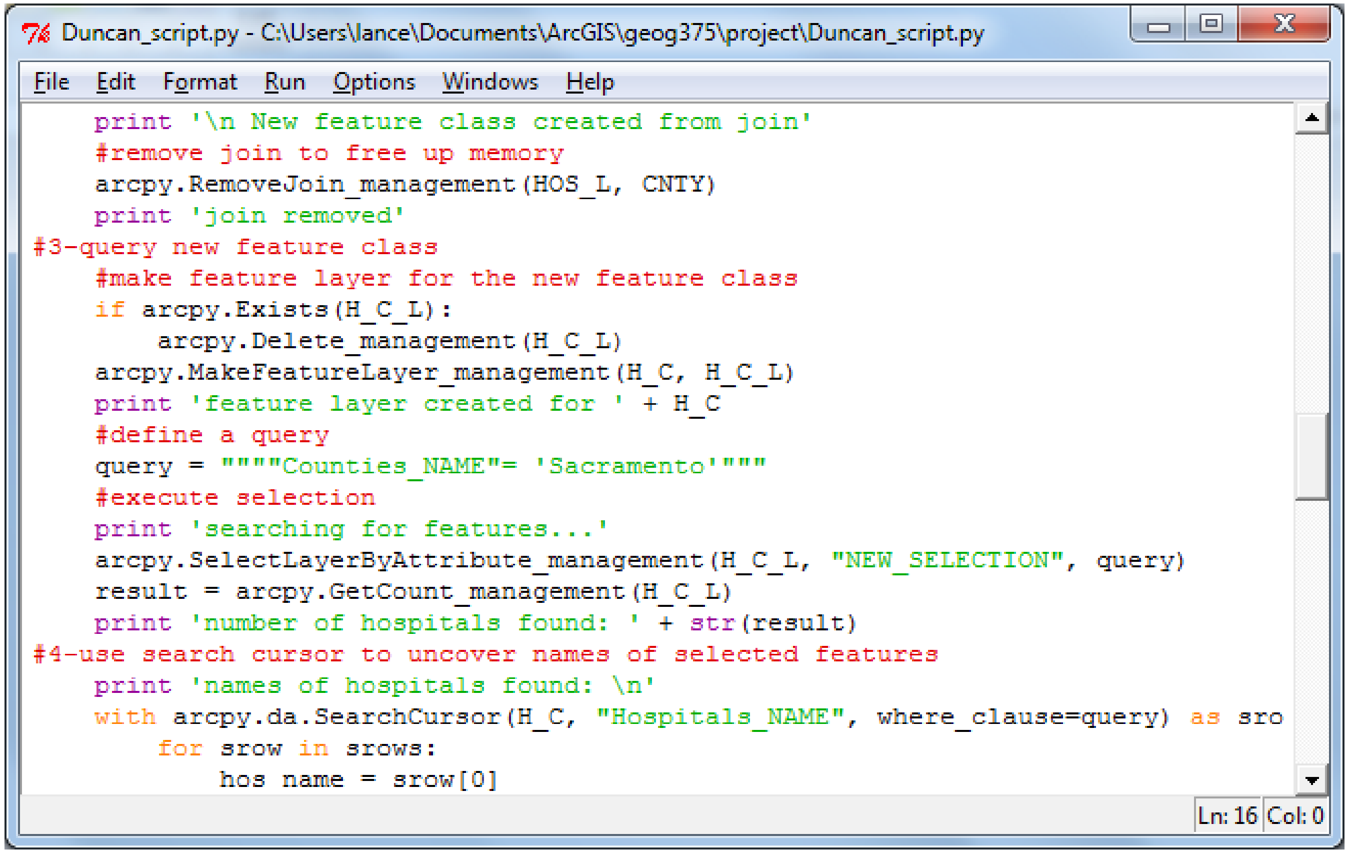
```
map_path = 'C:\\Users\\lance\\Documents\\ArcGIS\\geog375\\project\\'
mxd = MapDocument(map_path + 'Project.mxd')
TODAY = datetime.date.today().strftime('%m.%d.%Y')
author = 'Lance Duncan'
df = ListDataFrames(mxd, "Layers") [0]
sac = map_path + 'sac.mxd'

try:
#1-join hospitals with counties
    #create indexes, first deleting any previuosly made
    indexes = arcpy.ListIndexes(CNTY)
    for index in indexes:
        if(index.name == 'cnty_index'):
            arcpy.RemoveIndex_management(CNTY, 'cnty_index')
    indexes = arcpy.ListIndexes(HOS)
    for index in indexes:
        if(index.name == 'hos_index'):
            arcpy.RemoveIndex_management(HOS, 'hos_index')
    arcpy.AddIndex_management(CNTY, 'NAME; STATE_NAME; FIPS', 'cnty_index', 'NON
    print 'index created for ' + CNTY
    arcpy.AddIndex_management(HOS, 'NAME; STCTYFIPS; ELEV_METER', 'hos_index', '
    print 'index created for ' + HOS
    #create feature layers, first deleting any previuosly made
    if arcpy.Exists(CNTY_L):
        arcpy.Delete_management(CNTY_L)
    if arcpy.Exists(HOS_L):
        arcpy.Delete_management(HOS_L)
    arcpy.MakeFeatureLayer_management(CNTY, CNTY_L)
    print 'feature layer created for ' + CNTY
    arcpy.MakeFeatureLayer_management(HOS, HOS_L)
    print 'feature layer created for ' + HOS
    #execute join
    arcpy.AddJoin_management(HOS_L, "STCTYFIPS", CNTY_L, "FIPS", "KEEP_ALL")
    print 'joined ' + CNTY_L + ' and ' + HOS_L
    #print field names of join to ensure proper completion
    fields = arcpy.ListFields(HOS_L)
    print 'resulting fields: \n'
    for field in fields:
        print field.name
#2-create new feature class from join
```

Attempt 2



Duncan_script.py - C:\Users\lance\Documents\ArcGIS\geog375\project\Duncan_script.py
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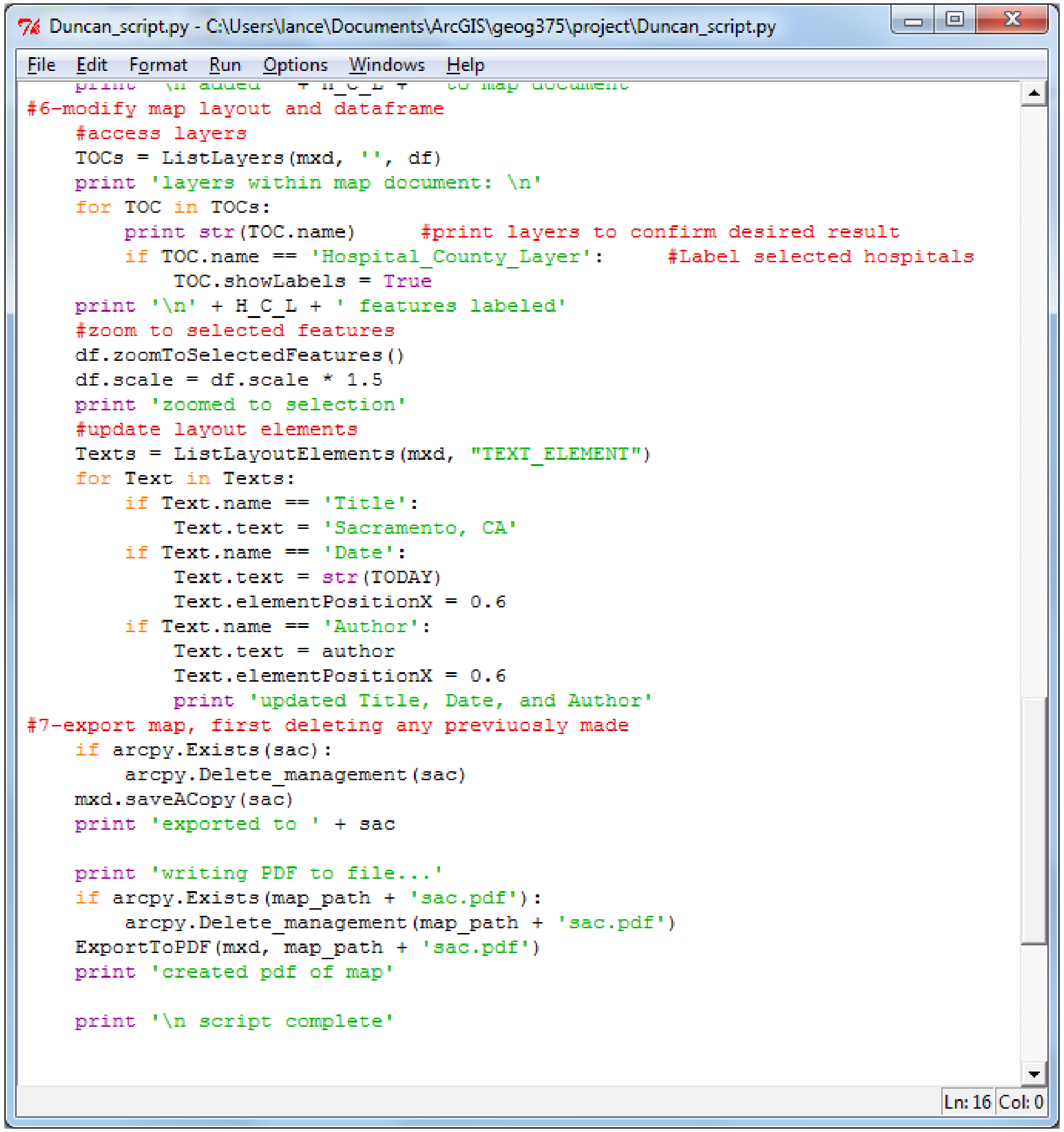
```
    print '\n New feature class created from join'
    #remove join to free up memory
    arcpy.RemoveJoin_management(HOS_L, CNTY)
    print 'join removed'
#3-query new feature class
    #make feature layer for the new feature class
    if arcpy.Exists(H_C_L):
        arcpy.Delete_management(H_C_L)
    arcpy.MakeFeatureLayer_management(H_C, H_C_L)
    print 'feature layer created for ' + H_C
    #define a query
    query = """"Counties_NAME"= 'Sacramento'"""
    #execute selection
    print 'searching for features...'
    arcpy.SelectLayerByAttribute_management(H_C_L, "NEW_SELECTION", query)
    result = arcpy.GetCount_management(H_C_L)
    print 'number of hospitals found: ' + str(result)
#4-use search cursor to uncover names of selected features
    print 'names of hospitals found: \n'
    with arcpy.da.SearchCursor(H_C, "Hospitals_NAME", where_clause=query) as sro
        for srow in srows:
            hos_name = srow[0]
```

Attempt 2


Duncan_script.py - C:\Users\lance\Documents\ArcGIS\geog375\project\Duncan_script.py
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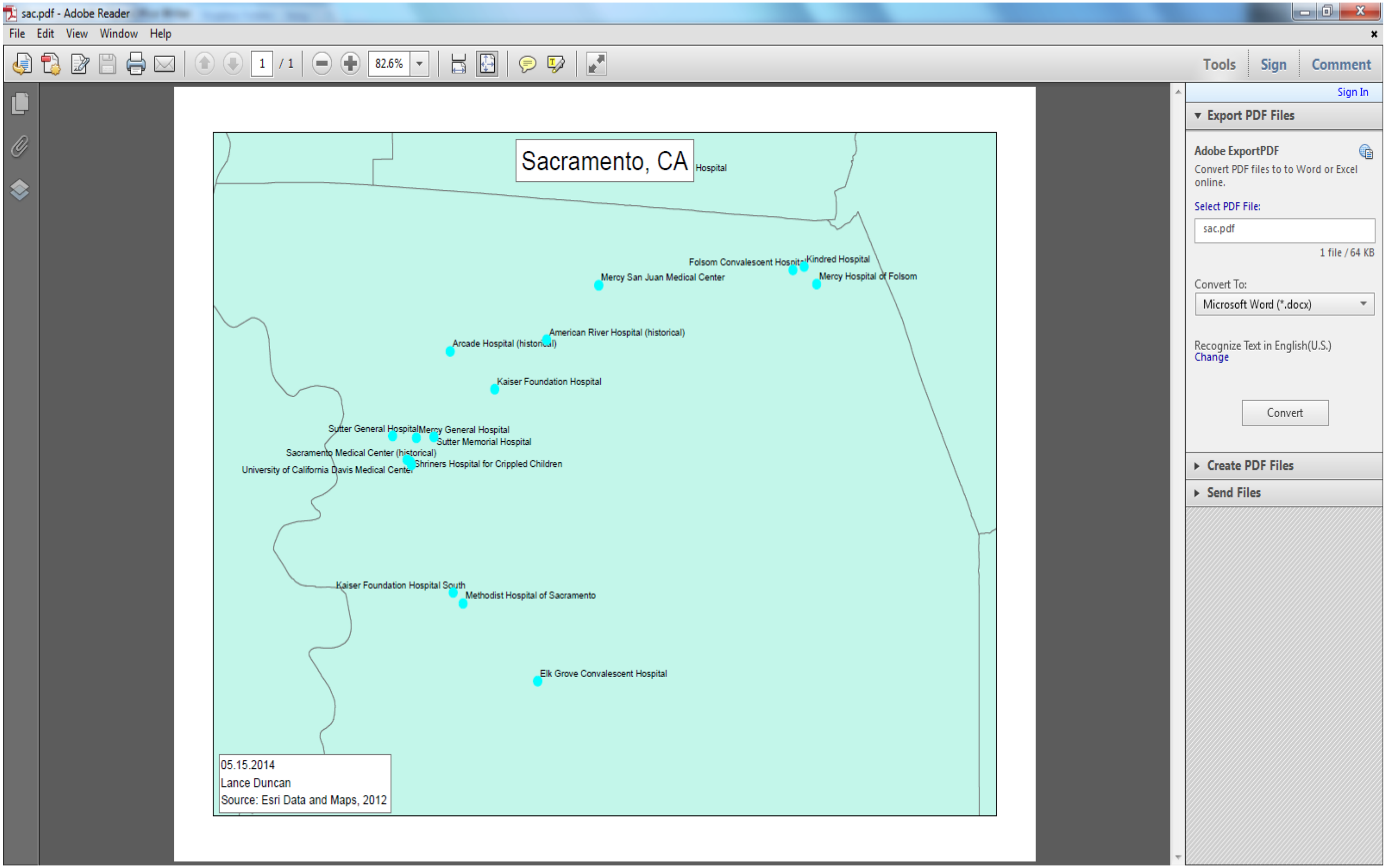
```
    print '\n added ' + H_C_L + ' to map document'
#6-modify map layout and dataframe
    #access layers
    TOCs = ListLayers(mxd, '', df)
    print 'layers within map document: \n'
    for TOC in TOCs:
        print str(TOC.name)      #print layers to confirm desired result
        if TOC.name == 'Hospital_County_Layer':      #Label selected hospitals
            TOC.showLabels = True
    print '\n' + H_C_L + ' features labeled'
    #zoom to selected features
    df.zoomToSelectedFeatures()
    df.scale = df.scale * 1.5
    print 'zoomed to selection'
    #update layout elements
    Texts = ListLayoutElements(mxd, "TEXT_ELEMENT")
    for Text in Texts:
        if Text.name == 'Title':
            Text.text = 'Sacramento, CA'
        if Text.name == 'Date':
            Text.text = str(TODAY)
            Text.elementPositionX = 0.6
        if Text.name == 'Author':
            Text.text = author
            Text.elementPositionX = 0.6
            print 'updated Title, Date, and Author'
#7-export map, first deleting any previuosly made
    if arcpy.Exists(sac):
        arcpy.Delete_management(sac)
    mxd.saveACopy(sac)
    print 'exported to ' + sac

    print 'writing PDF to file...'
    if arcpy.Exists(map_path + 'sac.pdf'):
        arcpy.Delete_management(map_path + 'sac.pdf')
    ExportToPDF(mxd, map_path + 'sac.pdf')
    print 'created pdf of map'

    print '\n script complete'
```

Result


sac.pdf - Adobe Reader
File Edit View Window Help
1 / 1
82.6%
Tools Sign Comment
Sign In
Export PDF Files
Adobe ExportPDF
Convert PDF files to to Word or Excel online.
Select PDF File:
sac.pdf
1 file / 64 KB
Convert To:
Microsoft Word (*.docx)
Recognize Text in English(U.S.)
Change
Convert
Create PDF Files
Send Files
Sacramento, CA
Hospital
Folsom Convalescent Hospital
Kindred Hospital
Mercy San Juan Medical Center
Mercy Hospital of Folsom
American River Hospital (historical)
Arcade Hospital (historical)
Kaiser Foundation Hospital
Sutter General Hospital
Mercy General Hospital
Sutter Memorial Hospital
Sacramento Medical Center (historical)
Shriners Hospital for Crippled Children
University of California Davis Medical Center
Kaiser Foundation Hospital South
Methodist Hospital of Sacramento
Elk Grove Convalescent Hospital
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Lance Duncan
Source: Esri Data and Maps, 2012

Conclusions

- First or most obvious approach might not be the best approach
- I was not proficient at using the mapping module
- GUI possibilities